



COLEOPTERA ASSOCIATED WITH GALLS FROM SOUTH AMERICA WITH NEW RECORDS ¹

(With 2 figures)

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ABSTRACT: Two new records of coleopterous galls, one on *Croton antisiphiliticus* Mart. (Euphorbiaceae) and the other on *Hippocratea volubilis* L. (Hippocrateaceae), and two new records of inquiline weevils in galls are presented from Brazil. Besides, all available data on coleopterous galls from South America is compiled and the diversity of them is discussed.

Key words: South America, Coleoptera, galls, new records.

RESUMO: Coleoptera associados com galhas da América do Sul com novos registros.

Dois novos registros de galhas de Coleoptera, um em *Croton antisiphiliticus* Mart. (Euphorbiaceae) e o outro em *Hippocratea volubilis* L. (Hippocrateaceae), e dois novos registros de besouros inquilinos de galhas são apresentados do Brasil. Além disso, todos os dados disponíveis sobre galhas de Coleoptera da América do Sul são compilados e a sua diversidade é discutida.

Palavras-chaves: América do Sul, Coleoptera, galhas, novos registros.

INTRODUCTION

Galls are predictable and consistent plant deformations that occur in response to feeding or other stimulus by foreign organisms (Gagné, 1994). They can be induced by mites, insects, nematodes, fungi, bacteria and others. Among the insects, galling species are found in several orders, such as Diptera, Lepidoptera, Hemiptera, Coleoptera, Hymenoptera and Thysanoptera.

Little is known about the taxonomy, ecology and diversity of coleopterous galls in South America. Literature data are scattered in some papers on entomogenous galls, namely: COSTA-LIMA (1956); FERNANDES, TAMEIRÃO NETO & MARTINS (1988); FERNANDES *et al.* (1989, 1996); FIEDLER (1940); GONÇALVES-ALVIM & FERNANDES (2001); HOUARD (1933); KIEFFER & HERBST (1905); KIEFFER & JÖRGENSEN (1910); JÖRGENSEN (1916); MONTEIRO *et al.* (1993); TAVARES (1917); VANIN, MONTEIRO & FERRAZ (2000) and MAIA & FERNANDES (in press.).

In this paper, we add new data on Coleopterous galls from Brazil and gathers all record from South America in order to discuss the richness of the galling species, host plant preferences and patterns of distribution.

MATERIAL AND METHODS

This paper includes data extracted from the literature and data obtained by us. In spite of our studies focusing on gall midges (Diptera: Cecidomyiidae), some data on coleopterous galls have been obtained. Photographies of these galls were taken in field. Galled plant organs were collected and transferred in plastic bags to the laboratory of Diptera, where part of the sample was dissected in order to observe the immatures in the gall chamber. Part was kept in plastic pots covered with a fine screen in order to obtain adults. The material obtained were preserved in alcohol 70%. Dried galls were deposited in the collection of the Museu Nacional - Rio de Janeiro (MNRJ).

RESULTS AND DISCUSSION

Twenty seven records of Coleopterous galls are listed, including the new ones presented herein. These galls occurred on 24 species of host plant and 14 families (Tab.1). Almost all galls have been recorded on angiosperms (monocotyledons: n=1 and dicotyledons: n=25), excepting one on gymnosperms (Gnetaceae: *Ephedra americana* Humbt. et Bonpl.).

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Table 1. Distribution and richness of coleopterous galls on host plants and localities in South America. References are also given.

FAMILY	HOST PLANT SPECIES	# KIND OF GALLS	DISTRIBUTION	REFERENCES
Alismaceae	<i>Sagittaria montevidensis</i> Cham. & Schlecht. f. <i>immaculata</i> Hicken	01	Argentina	HOUARD, 1933
Anacardiaceae	<i>Schinus dependens</i> Ortega	01	Chile	KIEFFER & HERBST, 1905; HOUARD, 1933
Annonaceae	<i>Portulaca oleracea</i> L.	01	Argentina	HOUARD, 1933
	<i>Xilopia aromatica</i> (Lam.) Mart.	01	Brazil	FERNANDES <i>et al.</i> , 1989
Apocynaceae	<i>Aspidosperma tomentosum</i> Mart.	01	Brazil	GONÇALVES-ALVIM & FERNANDES, 2001
Asteraceae	<i>Baccharis concinna</i> Barroso	02	Brazil	FERNANDES <i>et al.</i> , 1996
	<i>Baccharis paucidentata</i> DC.	01	South America	HOUARD, 1933
	<i>Eupatorium</i> sp.	01	Brazil	TAVARES, 1917B; HOUARD, 1933
	<i>Parthenium hysterophorus</i> L.	01	Argentina	FIEDLER, 1940
Bombacaceae	<i>Eriotheca gracilipes</i> (K. Schum) A. Robyns	01	Brazil	GONÇALVES-ALVIM & FERNANDES, 2001
Euphorbiaceae	<i>Croton antisiphiliticus</i> Mart.	01	Brazil	new record
Fagaceae	<i>Nothofagus obliqua</i> Blume	02	Chile	KIEFFER & HERBST, 1905; HOUARD, 1933
Gnetaceae	<i>Ephedra tweediana</i> C. A. Mey.	01	Argentina	HOUARD, 1933
Hippocrateaceae	<i>Hippocratea volubilis</i> L.	01	Brazil	new record
Leguminosae	<i>Andira</i> sp.	01	Brazil	FERNANDES & MAIA, 2004
	<i>Dahlstedtia pinnata</i> (Benth.) Malme	01	Brazil	COSTA-LIMA, 1956
	<i>Eriosema</i> sp.	01	Brazil	GONÇALVES-ALVIM & FERNANDES, 2001
	<i>Prosopis alba</i> Griseb.	01	Argentina	JÖRGENSEN, 1916; HOUARD, 1933
	<i>Prosopis alpataco</i> Phil.	01	Argentina	KIEFFER & JÖRGENSEN, 1910; HOUARD, 1933
	<i>Prosopis campestris</i> Griseb.	01	Argentina	HOUARD, 1933
Myrtaceae	<i>Gomidesia fenzliana</i> Berg	01	Brazil	MONTEIRO <i>et al.</i> , 1993; VANIN <i>et al.</i> , 2000
	<i>Gomidesia martiana</i> Berg	01	Brazil	MONTEIRO <i>et al.</i> , 1993; VANIN <i>et al.</i> , 2000
Solanaceae	<i>Solanum grandiflorum</i> Ruiz & Pav.	01	Brazil	COSTA-LIMA, 1956
	<i>Solanum</i> sp	01	Brazil	COSTA-LIMA, 1956
Tiliaceae	<i>Luehkea divaricata</i> Mart.	01	Brazil	FERNANDES <i>et al.</i> , 1988

Leguminosae and Asteraceae were the plant families with the greatest richness of galls, with six and five kinds of gall, respectively. The other families presented one or two kinds of gall. Most plant species supported only one kind of gall, excepting *Baccharis concinna* Barroso (n=3) and *Notophagus obliqua* Blume (n=2) (Tab. 1).

Most galls (about 70%) were induced on stem or buds. The leaves were the second most attacked plant organ (about 15%), followed by roots (about 7%), flowers (3.7%) and tendril (3.7%). None galls occurred on fruits (Tab.2). Almost all gall inducers attacked a specific plant organ, excepting one which attacked simultaneously stem, petiole and midvein. These data indicate a predominance of coleopterous galls on Leguminosae in South America and reveal

Table 2. Distribution of coleopterous gall on plant parts in South America.

KINDS OF GALLS	NUMBER	PERCENTAGE
Stem or bud	19	70.37%
Leaf	4	14.82%
Root	2	7.41%
Flower	1	3.70%
Tendril	1	3.70%
Fruit	0	0%

the stem as the plant organ preferentially attacked by the coleopteran galling species. It is important to emphasize that the Leguminosae constitute a very diverse family of plant in the Neotropical region, being also commonly attacked by other gall maker insects, such as cecidomyiids (Diptera), coccoids (Hemiptera) and others. And the stem is also the most attacked organ by lepidopteran galling species, contrasting with the cecidomyiids, which induce galls mainly in leaves.

Concerning the taxonomy of the coleopteran gall makers, only six species have been identified (Tab.3). The other records have been presented at genera (n=3), family (n=4) or order level (n=12; about 44.5%). These data reveal how the taxonomy of the galling species is poorly known. The identified species belong to five genera distributed into three families according to ALONSO-ZARAZAGA & LYAL (1999): Apionidae - *Apion* Herbst, 1797 (2 spp.); Curculionidae - *Collabismus* Schoenherr, 1837 (1 sp.), *Conotrachelus* Dejean, 1835 (1 sp.), *Pacholenus* Schoenherr, 1826 (1 sp.) and Erirhinidae - *Hypselus* Schoenherr, 1843 (1 sp.), all of them are included in the same superfamily - Curculionoidae. The identified galling species are associated with only one host plant species or with two congeneric species, so these gall makers showed a high specificity of host.

Table 3. Distribution of coleopteran species on host plants, plant parts and localities in South America.

COLEOPTERAN GALLING SPECIES	HOST PLANT	PLANT PART	LOCALITY
Apionidae			
<i>Apion angustatum</i> Philippi	<i>Nothofagus obliqua</i> Blume	stem	Chile
<i>Apion prosopides</i> Kieff. & Jörg., 1910	<i>Prosopis alba</i> Griseb.	stem	Argentina
	<i>Prosopis alpataco</i> Phil.	leaf	Argentina
<i>Apion</i> sp.1	<i>Croton antisiphiliticus</i> Mart.	leaf	Brazil
<i>Apion</i> sp.2	<i>Portulaca oleracea</i> L.	flower	Argentina
<i>Apion</i> sp.3	<i>Dahlstedtia pinnata</i> (Benth.) Malme	stem	Brazil
Curculionidae			
<i>Collabismus clitellae</i> Boheman, 1837	<i>Solanum grandiflorum</i> Ruiz & Pav.	stem	Brazil
	<i>Solanum</i> sp.	stem	Brazil
<i>Conotrachelus albocinereus</i> Fiedler 1940	<i>Parthenium hysterophorus</i> L.	stem	Argentina
<i>Pacholenus pelliceus</i> Boheman, 1836	<i>Gomidesia fenziiana</i> Berg	stem	Brazil
	<i>Gomidesia martiniana</i> Berg	stem	Brazil
Erirhinidae			
<i>Hypselus ater</i> Boehman, 1843 (= <i>Anchonoides bonariensis</i> Brèthes, 1910)	<i>Sagittaria montevidensis</i> Cham. & Schlecht. f. <i>immaculata</i>	root	Argentina

Some species of Coleoptera are inquilines of galls. Two records of inquiline species are presented for the first time in this paper (Tab.4) . These inquiline weevils are associated with four different galls (3 induced by Diptera: Cecidomyiidae and the other induced by Lepidoptera: Momphidae) on four plant species.

The records of coleopterous galls from South America have been restricted to three countries: Brazil (with about 59% of the records), followed by Argentina (with about 26%) and Chile (with about 11%). None information is available for the other South American localities (Tab.5). Besides, data from Brazil have been restricted to four states, three of them situated in the Southern region: Minas Gerais, Rio de Janeiro and São Paulo, with approximately 59%, 23% and

Table 5. Distribution of records of coleopterous galls in South America.

COUNTRY	KIND OF GALLS	
	NUMBER	PERCENTAGE
Brazil	16	55.3%
Argentina	7	25.9%
Chile	3	11.1%
South America	1	3.7%

12%, respectively, and one in the central plateau: Goiás with 6% (Tab.6). The published data also show the temporal (see references) and spatial discontinuity of the investigations in Brazil.

Table 4. Distribution of coleopteran inquiline of galls on host plants and plant parts. Information about the galling species is given.

INQUILINUS SPECIES	HOST PLANT	PLANT PART	GALL MAKER	LOCALITY
<i>Anthonomus</i> sp.	<i>Leandra aurea</i> (Cham.) Cogn. (Melastomataceae)	stem	Momphidae (Lepidoptera)	Brazil
Curculionidae sp.1	<i>Copaifera langsdorffii</i> Desf. (Leguminosae)	leaf	Cecidomyiidae (Diptera)	Brazil
*Curculionidae sp.2	<i>Neomitranthes obscura</i> (DC) N.J.E.Silveira	stem	<i>Neomitranthella robusta</i> Maia, 1995 (Cecidomyiidae)	Brazil
*Curculionidae sp.3	<i>Eugenia rotundifolia</i> Casar	stem	<i>Stephomyia rotundifoliorum</i> Maia, 1993 (Cecidomyiidae)	Brazil

(*) new record.

Table 6. Distribution of records of coleopterous galls in Brazil.

HOST PLANT	NO KIND OF GALLS	STATE
<i>Andira</i> sp.	01	MG
<i>Aspidosperma tomentosum</i>	01	MG
<i>Baccharis concinna</i>	02	MG
<i>Croton antisiphiliticus</i>	01	MG
<i>Eriosema</i> sp.	01	MG
<i>Eriotheca gracilipes</i>	01	MG
<i>Luehea divaricata</i>	01	MG
<i>Solanum grandiflorum</i>	01	MG
<i>Xilopia aromatica</i>	01	MG
<i>Dahlstedtia pinnata</i>	01	RJ
<i>Gomidesia fenziiana</i>	01	RJ
<i>Gomidesia martiana</i>	01	RJ
<i>Hippocratea volubilis</i>	01	RJ
<i>Eupatorium</i> sp.	01	SP
<i>Solanum</i> sp.	01	SP, GO

(GO) Goiás; (MG) Minas Gerais; (RJ) Rio de Janeiro; (SP) São Paulo.

Coleopterous galls on *Croton antisiphiliticus* Mart. (Euphorbiaceae) and on *Hippocratea volubilis* L. (Hippocrateaceae) are described following. Illustrations of these galls are given.

GALLS DESCRIPTIONS

Coleopterous gall on *Croton antisiphiliticus* Mart. (Euphorbiaceae)

Succulent stem, petiole or midvein gall, green, irregular in shape, with 1.5-2.0cm of length and

multichambered (Fig.1). Gall maker: *Apion* sp. (Apionidae). Locality: Serra de São José (Tiradentes, Minas Gerais State, Brazil).

Coleopterous gall on *Hippocratea volubilis* L. (Hippocrateaceae)

Petiole swelling, brown, ovoid, unichambered, with 0.8-1.0cm of length and onechambered (Fig.2). Gall maker: Curculionidae (Coleoptera). Locality: Restinga of Grumari (Rio de Janeiro, State of Rio de Janeiro, Brazil).



Coleopterous galls on: fig.1- *Croton antisiphiliticus* Mart. (Euphorbiaceae); fig.2- *Hippocratea volubilis* L. (Hippocrateaceae).

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